

### REMARKS

This communication responds to the Office Action mailed on May 20, 2004. No claims are amended, no claims are canceled, and no claims are added. As a result, claims 1-28 are now pending in this Application. If the Examiner is not convinced that the pending claims are in condition for allowance after reviewing this document, the courtesy of an Examiner's Interview is respectfully requested prior to preparing and mailing a Final Office Action.

#### §102 Rejection of the Claims

Claim 18 was rejected under 35 USC § 102(b) as being anticipated by Beausang (U.S. 5,828,579, hereinafter "Beausang-3"). Claims 10, 16 and 17 were rejected under 35 USC § 102(b) as being anticipated by Beausang et al. (U.S. 5,903,466, hereinafter "Beausang-1"). The Applicants do not admit that Beausang-1 or Beausang-3 are prior art, and reserve the right to swear behind these references at a later date. In addition, because the Applicants assert that the Office has not shown that Beausang-1 or Beausang-3 discloses the identical invention as claimed, the Applicants respectfully traverse these rejections of the claims.

It is respectfully noted that anticipation under 35 USC § 102 requires the disclosure in a single prior art reference of each element of the claim under consideration. *See Verdegaal Bros. V. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987). It is not enough, however, that the prior art reference discloses all the claimed elements in isolation. Rather, "[a]nticipation requires the presence in a single prior reference disclosure of each and every element of the claimed invention, *arranged as in the claim.*" *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984) (citing *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 220 USPQ 193 (Fed. Cir. 1983)) (emphasis added).

With respect to claim 18, it is respectfully noted that Beausang-3 is directed toward a scan chain design database that defines a hierarchical circuit design as a netlist of logic cells, some of which contain scan structure. See Beausang-3, Col. 6, lines 47-66. Inferred scan structures may be recognized and replaced with explicit scan structures. See Beausang-3, Col. 7, lines 7-28. While the assertion is made in the Office Action that Beausang-3 Figs. 6A, 6B, and

7B illustrate various elements of the claim, it is respectfully noted that these elements are actually shown as part of creating balanced scan chains.

FIGs. 6A and 6B show before and after snapshots of synthesis results for two different chains having a single clock domain, while FIGs. 7A and 7B show before and after snapshots of synthesis results for two different chains having a mixed clock edge design. See Beausang-3, Col. 33, lines 5-50. The Applicants were unable to locate the activities of “expanding the repeated circuit structure” (there is no repeated structure shown) and “grafting the expanded structure” (since there is no expanded structure) as claimed by the Applicants.

As to claim 10, it appears two elements claimed by the Applicants (i.e., “merging a plurality of extended latch boundary components into a plurality of partitions” and “maintaining a load balance within the plurality of partitions”) were not addressed in the Office Action, and the Applicants were unable to find an indication of their existence in Beausang-1.

As to claim 16, it is respectfully noted that there is no indication that the circuit combination shown in FIG. 13B of Beausang-1 was formed by the claimed process (i.e., a method of forming an extended latch boundary component comprising “selecting a path having a first node selected from a group consisting of latches and primary outputs and a second node selected from a group consisting of latches and primary inputs”).

As to claim 17, there do not appear to be either “primary inputs” (e.g., only a single primary input 307 is shown in FIG. 3A) or “primary outputs” (none are shown) as set forth in the claim (i.e., a path comprising a plurality of first nodes selected from a group consisting of latches and primary outputs and a plurality of second nodes selected from a group consisting of latches and primary inputs, where the path can include a plurality of latches between the plurality of first nodes and the plurality of second nodes”).

Finally, while it is asserted in the Office Action that Beausang-1 teaches “a plurality of first nodes (Figure 15A ...), with a plurality of output latches (Figure 3B), the Applicants can find no logical connection between these elements within the bounds of Beausang-1. The cited portions of this reference (FIGS. 13B, 15A, and 3B) are directed to a scan insertion process to (i) move a load from a  $Q$  logic output to a  $\overline{Q}$  logic output to adjust the load input phase; (ii) move a load to a logically-equivalent driving input so the original driver can be downsized; and (iii) replace HDL-specified, non-scan memory cells with DFT scannable memory cells. Beausang-1,

Col. 6 line 15 – Col. 7, line 6; and Col. 24, line 58 – Col. 25, line 24. Thus, it does not appear that it is possible for the cited combination to exist according to the teachings of Beausang-1.

“The *identical invention* must be shown in as complete detail as is contained in the ... claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989); MPEP § 2131 (emphasis added). Therefore, since what is disclosed by Beausang-1 and Beausang-3 is not identical to the subject matter of the embodiments claimed, the rejection of claims 10 and 16-18 under § 102(b) is improper. Reconsideration and allowance is respectfully requested.

### §103 Rejection of the Claims

Claims 1, 2 and 21 were rejected under 35 USC § 103(a) as being unpatentable over Beausang-1 in view of Beausang et al. (U.S. 5,949,692, hereinafter “Beausang-2”). Claim 14 was rejected under 35 USC § 103(a) as being unpatentable over Beausang-1 in view of Beausang-3. First, the Applicants do not admit that Beausang-1, Beausang-2, or Beausang-3 are prior art, and reserve the right to swear behind these references in the future. Second, since a *prima facie* case of obviousness has not been established in each case, the Applicants respectfully traverse these rejections.

The Examiner has the burden under 35 U.S.C. § 103 to establish a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 1074, 5 U.S.P.Q.2d (BNA) 1596, 1598 (Fed. Cir. 1988). In combining prior art references to construct a *prima facie* case, the Examiner must show some objective teaching in the prior art or some knowledge generally available to one of ordinary skill in the art that would lead an individual to combine the relevant teaching of the references. *Id.* The M.P.E.P. contains explicit direction to the Examiner that agrees with the *In re Fine* court:

In order for the Examiner to establish a *prima facie* case of obviousness, three base criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Appellant's disclosure. *M.P.E.P.* § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d (BNA) 1438 (Fed. Cir. 1991)).

An invention can be obvious even though the suggestion to combine prior art teachings is not found in a specific reference. *In re Oetiker*, 977 F.2d 1443, 24 U.S.P.Q.2d (BNA) 1443 (Fed. Cir. 1992). However, while it is not necessary that the cited references or prior art specifically suggest making the combination, there must be some teaching somewhere which provides the suggestion or motivation to combine prior art teachings and applies that combination to solve the same or similar problem which the claimed invention addresses. One of ordinary skill in the art will be presumed to know of any such teaching. (See, e.g., *In re Nilssen*, 851 F.2d 1401, 1403, 7 U.S.P.Q.2d 1500, 1502 (Fed. Cir. 1988) and *In re Wood*, 599 F.2d 1032, 1037, 202 U.S.P.Q. 171, 174 (C.C.P.A. 1979)). However, the level of skill is not that of the person who is an innovator but rather that of the person who follows the conventional wisdom in the art. *Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 474, 227 U.S.P.Q. 293, 298 (Fed. Cir. 1985). The requirement of a suggestion or motivation to combine references in a *prima facie* case of obviousness is emphasized in the Federal Circuit opinion, *In re Sang Su Lee*, 277 F.3d 1338; 61 U.S.P.Q.2D 1430 (Fed. Cir. 2002), which notes that the motivation must be supported by evidence in the record.

No proper *prima facie* case of obviousness has been established because (1) combining the references does not teach all of the limitations set forth in the claims, (2) there is no motivation to combine the references, and (3) combining the references provides no reasonable expectation of success. Each of these points will be explained in detail, as follows.

***Combining References Does Not Teach All Limitations:*** First, with respect to independent claims 1 and 21, no combination suggested in the Office Action will render all of the claim limitations. It is admitted by the Office that Beausang-1 does not disclose “partitioning the plurality of extended latch boundary components” as claimed by the Applicants. Neither does Beausang-2.

Beausang-2 is directed to a synthesis process of scan insertion/replacement and routing. See Beausang-2, Col. 31, lines 48-56. The Applicants were unable to find any reference within the bounds of Beausang-2 to partitioning “extended latch boundary components.” Rather, the figures cited in the Office Action (Beausang-2, FIGs. 2A and 6A-14B) illustrate various portions of scan chains; partitioning of extended latch boundary components to serve any of the purposes

noted by the Applicants in the Application is not taught. Thus, independent claims 1 and 21 are nonobvious. This conclusion applies with even greater force respecting dependent claim 2, since any claim depending from a nonobvious independent claim is also nonobvious. See M.P.E.P. § 2143.03.

Second, with respect to independent claim 14, the Office admits that Beausang-1 does not disclose grouping “grouping a plurality of extended latch boundary components into a plurality of partions”, as claimed by the Applicants. Neither does Beausang-3.

Beausang-3 is also directed to a synthesis process of scan insertion/replacement and routing. See Beausang-3, Col. 32, lines 22-42. The Applicants were unable to find any reference within the bounds of Beausang-3 to partitioning “grouping a plurality of extended latch boundary components into a plurality of partions.” Rather, the cited segments of Beausang-3 (Beausang-3, Col. 12, lines 45-55) serve to define scan groups, scan links, and scan chains; grouping extended latch boundary components to serve any of the purposes noted by the Applicants in the Application is not taught. Thus, independent claim 14 is nonobvious.

***No Motivation to Combine References:*** The Office asserts that one would be motivated to combine Beausang-1 with Beausang-2 or Beausang-3 so that a designer would be enabled to “sign off” his or her work at the completion of module design, without later disruption. See Office Action, Pg. 7. However, as pointed out in the Office Action, Beausang-1 already provides an enabling solution.

The assertion is made by the Office that, nevertheless, one of skill in the art “would have been motivated to find a better solution to decrease the amount of time required to compile a design.” It is further asserted that it would therefore have been obvious to combine Beasang-1 with either Beausang-2 or Beausang-3 so that “the IC designer can now ‘sign off’ his or here work at the completion of the module design” so that completed/optimized modules do not later have to be disrupted. However, the Applicants do not understand that enabling designer sign off necessarily satisfies the motivation noted in the Office Action. In fact, the combination may require *extra* time to finalize individual module designs, potentially creating a *longer* compilation time, since each module must now be perfected by its individual designer prior to top level analysis. See Beausang-2, Col. 3, lines 3-11 and Beausang-3, Col. 3, lines 4-12. Thus, there is no motivation to combine Beausang-1 with either Beausang-2 or Beausang-3.

Since Beausang-1 teaches away from the suggested combinations, the use of unsupported assertions in the Office Action does not satisfy the explicit requirements needed to demonstrate motivation as set forth by the *In re Sang Su Lee* court. Therefore, the Examiner appears to be using personal knowledge, and is respectfully requested to submit an affidavit as required by 37 C.F.R. § 1.104(d)(2).

***No Reasonable Expectation of Success:*** As has been previously noted, modifying Beausang-1 to implement independent completion of modules by various designers may create additional barriers to overall design completion, without providing a “system that can reduce the time required to perform circuit synthesis ...” See Beausang-1, Col. 4, lines 18-19. Introducing a human element into an electronic design process rarely speeds anything up; in fact, “[d]esign, checking and testing of large scale integrated circuits are so complex that the use of programmed computer systems are required for realization of normal circuits.” See Beausang-1, Col. 1, lines 21-23.

In addition, as noted above, several elements of claims 1-2, 14, and 21 are not provided by any of the cited references. Thus, there is no reasonable expectation that any combination of Beausang-1, Beausang-2, and Beausang-3 will be unable to provide the missing elements, such as “decomposing”, “partitioning”, and “grouping” extended latch boundary components, as claimed by the Applicants.

The test for obviousness under § 103 must take into consideration the invention as a whole; that is, one must consider the particular problem solved by the combination of elements that define the invention. *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1143, 227 U.S.P.Q. 543, 551 (Fed. Cir. 1985). References must be considered in their entirety, including parts that teach away from the claims. See MPEP § 2141.02. The fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 16 USPQ2d 1430 (Fed. Cir. 1990); M.P.E.P. § 2143.01.

Therefore, since there is no evidence in the record to support disclosure by either Beausang-1, Beausang-2, or Beausang-3 of “decomposing”, “partitioning”, and “grouping” extended latch boundary components, since there is no motivation to supply the missing elements (since the references teach away from such a combination), and since no reasonable

expectation of success arises, a *prima facie* case of obviousness has not been established with respect to independent claims 1, 14, and 21. This conclusion also applies to dependent claim 2, since any claim depending from a nonobvious independent claim is also nonobvious. It is therefore respectfully requested that the rejections of claims 6 and 10-36 under 35 U.S.C. § 103 be reconsidered and withdrawn.

*Allowable Subject Matter*

The Applicants note with appreciation the allowance of claims 25-28. Claims 3-9, 11-13, 15, 19-20, and 22-23 were objected to as being dependent upon a rejected base claim, and indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. However, the Applicants respectfully decline to amend these claims as it is believed the arguments above render the objection moot. Reconsideration and allowance of claims 3-9, 11-13, 15, 19-20, and 22-23 is therefore respectfully requested.

**CONCLUSION**

The Applicants respectfully submit that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone the Applicant's attorney, Mark Muller at (210) 308-5677, or Applicant's below-named attorney at (612) 349-9592 to facilitate prosecution of this application. If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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**CERTIFICATE UNDER 37 CFR 1.8:** The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: MS Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 19 day of July, 2004.

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